



[20110/00401]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Alex G. ZEIF
Serial No. : 10/090,102
Filing Date : July 26, 2002
For : METHOD AND APPARATUS FOR
SEQUENTIALLY COLLECTING AND
ANALYZING REAL TIME DATA WITH
INTERACTIVE MONITORING
Group Art Unit : 2161

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PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102(d)
ACCELERATED EXAMINATION

Sir:

Applicant hereby submits this Petition to have this application granted Special Status pursuant to 37 C.F.R. § 1.102(d) and M.P.E.P. 708.02, Subpart VIII.

A. Applicant's Claims Are Directed To A Single Invention

Applicant believes that all claims are directed to a single invention. Further, Applicant will make an election without traverse as a prerequisite to the grant of special status should the U.S. Patent and Trademark Office determine that all of the claims presented are not obviously directed to a single invention.

B. Applicant Has Caused A Pre-Examination Search To Be Made

Applicant has caused a pre-examination search to be conducted. The search was conducted by Applicant and a search agency using the official website of the USPTO
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and the USPTO library. Additionally, a computer database search was conducted using the USPTO systems EAST and WEST. Examiner Steven Garland in Class 700 (Art Unit 2121) was consulted in confirming the field of search.

The search was conducted in the following classes and subclasses:

<u>Class</u>	<u>Subclass(es)</u>
700	95, 108, 111, 174
702	81, 84

The following prior art was uncovered by the search:

<u>U.S. Patent No.</u>	<u>Inventor(s)</u>
4,718,025	Minor et al.
4,802,094	Nakamura et al.
4,956,783	Teranishi et al.
5,479,361	Kurtzberg et al.
5,586,041	Mangrulkar
5,691,895	Kurtzberg et al.
5,821,990	Rudt et al.
5,862,054	Li
5,896,293	Teramoto et al.
5,946,661	Rothschild et al.
5,970,476	Fahey
6,038,486	Saitoh et al.
6,115,643	Stine et al.
6,128,540	Van Der Vegt et al.
6,144,885	Scarrah
6,211,905	Rudt et al.
6,249,715	Yuri et al.
6,295,510	Discenzo

6,381,509

Thiel et al.

6,415,191

Pryor

Published Patent Application

2001/0025225

Inventor(s)

Ota et al.

2002/0071603

Ungpiyakul et al.

Literature References:

Hersh Kohli et. al, E-manufacturing Software for Product and Process Real-time Monitoring, 5 pages,
http://www.manufacturingpulse.com/news_events/smta_oct_2001_manufacturing_pulse.pdf

Gensym Corp., Real-time Monitoring Diagnosis, Control and Process Optimization, 3 pages <http://www.gensym.com/manufacturing/>

Syscon Int'l, Inc., Data Collection Modules, 4 pages,
<http://www.syscon-plantstar.com/literature/dcm.pdf>

C. Detailed Discussion of References

U.S. Patent No. 4,718,025 issued to Minor et al. describes a computer management manufacturing monitoring system. The input section of the system is coupled to a plurality of sensors. A logging program periodically reads the states of various sensors and stores information relating to each such sensor state in a data base. A database storage section stores the information received from the logging program relating to the reading of each sensor state read in a database format. A display generator causes information to be displayed from the database on a display screen.

U.S. Patent No. 4,802,094 issued to Nakamura et al. describes a method and an apparatus of removing works from each of the facilities in a production line in order to facilitate changing of a work monitoring operation. Work tracking conditions, work tracking management data, and plant status data are stored in the memory. The extracted management data is subjected to processing such as movement and updating in accordance with the contents of the above-

described data. In order to efficiently effect a process monitoring operation for each lot, the arrangement of each lot is stored in the form of a data-tree structure.

U.S. Patent No. 4,956,783 issued to Teranishi et al. describes a production process control system that includes a plurality of terminal devices and a central device connected thereto. Each of the terminal devices has an element for counting the amount of work done and generating a corresponding output, an element for entering a worker identifying code, an element for transmitting the counted output and the entered worker identifying code, an element for transmitting the counted output and the entered worker identifying code to the central device, and an element for providing an output cancel signal by which, in conjunction with the counted output, a current output value is updated. The central device has an element for performing communications with each terminal device and an element for storing the output and the worker identifying code transmitted from the terminal device as associated with each other.

U.S. Patent No. 5,479,361 issued to Kurtzberg et al. describes an apparatus and a method for quantitatively ranking the performance of each attribute contributing to a manufacturing process. Various signals representing the attributes that contributed to each manufacturing run are recorded. An iterative process is commenced whereby numeric weights are assigned to each attribute. The iterations are continued until the weights are determined for each attribute converge or become self-consistent. In this manner, the performance of non-numeric or attribute parameters such as operators and tools can be measured and defined in terms of a numeric quantity.

U.S. Patent No. 5,586,041 issued to Mangrulkar describes a method and a system for monitoring the operation of a machine having a traversing tool or die member, based on a plurality of features extracted from a process signature. The method includes defining the plurality of features, each feature representing a parameter associated with the process of forming the parts, and operating the machine so as to produce a predetermined number of production parts while collecting a production operating signature. The method also includes extracting the feature values from the production operating signature to obtain production feature values, and

comparing the production feature values to predetermined operating limits which represent limits within which acceptable parts are formed.

U.S. Patent No. 5,691,895 issued to Kurtzberg et al. describes a comprehensive on-line, real-time system employing statistical analysis and mathematical techniques with feedback and forward information for local control and global optimization comprising generic mechanism models, monitors, and controls. Manufacturing is treated as a hierarchy of processes which are modeled, controlled, optimized and managed via four interacting networks; an application modeling network, a local control network, a global optimization network, and an implementation/management network. Process models are developed and updated via on-line data analysis, and are used to evaluate process status and improvement path.

U.S. Patent No. 5,821,990 issued to Rudt et al. describes a system for continuously monitoring a process such as a paper making process wherein a plurality of video cameras are positioned at various positions along the process to monitor one or more predetermined characteristics of the process. The system includes a device for converting the monitored characteristics into digital format and a digital data storage device. The system includes a control device such as a computer which is capable of communicating with the data storage device and with a detector for detecting deviations from the monitored predetermined characteristics such that on receipt of a deviation signal the control device extracts from the digital data storage device digitized data corresponding to the deviations and displays such extracted deviation digitized data as for example on a video monitor.

U.S. Patent No. 5,862,054 issued to Li describes a method to monitor manufacturing process parameters from multiple process machines to provide real time statistical process control. The process parameters are collected on a single computer over a single RS 485 network, and each parameter is analyzed and displayed separately for each process and process machine. Statistical variables are calculated and presented on the computer screen along with graphs of the various parameters for a particular process machine. Data is aged out of the computer to an archival data base under the control of a manufacturing information system and connected to a company-wide network.

U.S. Patent No. 5,896,293 issued to Teramoto et al. describes a method and an apparatus consisting of supervisory computers which are individually disposed in various lines or other processes for producing and packaging photo film cartridges. Each supervisory computer controls process controllers of the associated line. The supervisory computers are controlled by a production information supervisory computer. Data obtained from the process controllers is sent through the line supervisory computers to the production information supervisory computer to be stored therein.

U.S. Patent No. 5,946,661 issued to Rothschild et al. describes a method and an apparatus to obtain cost, efficiency, bottleneck and value creation information in a manufacturing facility. Each work cell has an associated local processing apparatus for inputting process step quantity and time information. The local processing apparatus is coupled to a central processing apparatus via local area network. The central processing apparatus then identifies and calculates bottleneck costing information regarding the process steps, as well as the manufacturing facility bottleneck. Bottleneck cost information for products are then calculated based upon the manufacturing facility bottleneck or factory bottleneck. The bottleneck costing information is then transferred to a printer or projection display nearby a work cell.

U.S. Patent No. 5,970,476 issued to Fahey describes an information storage, processing, and reporting system for tracing enterprise wide product data. The system comprises a data storage, which is adapted for storing data entries related to a product family. The data is received in a data warehouse system and is catalogued by identifying data elements related to the selected product families. The system indexes the identified data elements which are related to a selected first product family in accordance with the data representative thereof. A storage medium is adapted for storing the grouped data elements in a rational database. A digital processor processes the grouped data elements in accordance with “activity-based-cost” criteria. The memory medium is adapted for storing the processed data in a relational database structure.

U.S. Patent No. 6,038,486 issued to Saitoh et al. describes a method of operating, controlling, monitoring and analyzing data of control devices used in the manufacturing devices

or equipment of a factory automation system. The system controls itself and executes operations by reading as necessary in real-time data in the form of files saved on a memory medium of each type of control device used in manufacturing devices or equipment.

U.S. Patent No. 6,115,643 issued to Stine et al. describes a method of identifying unacceptable levels of defects in specific sections or work centers of a manufacturing process on a real time basis and initiating corrective action. The system allows a user to define defect tolerances or thresholds for manufacturing work centers, tracks defects at the work centers, compares the level of faults with the tolerances, reports out of tolerance work centers, automatically initiates contact with the appropriate personnel to affect a correction to the out of tolerance work center, and maintains of corrective actions taken.

U.S. Patent No. 6,128,540 issued to Van Der Vegt et al. describes a method and a computer system for controlling an industrial process comprising a personal computer which is programmed with a database and a custom application. The database contains data describing the attributes and performance of the process to be controlled. The custom application calculates the financial value of each of the problems. The calculation of the financial value of each problem takes into account market conditions which affect the amount of product which could be sold if made and the marginal profitability of the product and how much optimum process time each problem takes up. The financial value the problems are used to prioritize the problems, allowing them to be remedied in accordance with their priority.

U.S. Patent No. 6,144,885 issued to Scarrah describes a manufacturing process improvement method operative in the presence of random process fluctuations with an allowance made for intervention by operating personnel. The method involves following a decision tree based on a number of heuristics. A sequence of phases progresses toward improved operating conditions. Reliance on small effects avoids severe process disruptions and leads to the incorporation of favorable variable interactions. Replications of variable perturbations and statistical analysis are used to identify small effects that coexist with random process fluctuations.

U.S. Patent No. 6,211,905 issued to Rudt et al. describes a system for monitoring

a process which includes a plurality of monitoring means such as a video camera which collects data relative to the process. The collected data is converted into a digital format and stored in a digital data storage device such that as new data is stored. The system also includes a control such as a computer which communicates with the digital data storage device. In the event of a deviation from a process parameter, the control is adapted to extract and display the digitized data corresponding to the deviation.

U.S. Patent No. 6,249,715 issued to Yuri et al. describes a method and apparatus for optimizing a work distribution, and in particular, to the optimization of work distribution along an assembly line or in a production process. A difficulty level is set for each task to be performed and a skill level is set for each respective worker. A time variation factor is set based upon the ranked work difficulty and the skill level of the workers. A compensation value is provided in accordance with the worker to whom an operation time of each element work is distributed, based upon a time variation factor. An assigned operation time per worker is maintained in equilibrium among respective workers by distributing each task in a preferential order, based on the compensated operation time.

U.S. Patent No. 6,295,510 issued to Discenzo describes a dynamo-electric machine diagnostic system that includes a docking station coupled thereto; a plurality of sensors operatively coupled to the docking station, at least one of the sensors being permanently positioned in the dynamo-electric machine for data gathering; and a diagnostic module, adapted to be received by and coupled to the docking station so that the diagnostic module may collect data output from at least one of the plurality of sensors.

U.S. Patent No. 6,381,509 issued to Thiel et al. describes a computerized system for tracking the activities of a manufacturing system. Identifiers for parts, subassemblies or assemblies produced or used by the manufacturing system are generated and stored by a data processing system, which then performs multi-level tracking using identifiers to facilitate tracking and reconstruction of the manufacturing process and components of any assembly. The system can determine that an assembly has been produced by a manufacturing step when identifiers for all required parts identified in manufacturing data for the process step have been

read and verified.

U.S. Patent No.6,415,191 issued to Pryor describes methods and an apparatus for “Intelligent” control of production processes such as machining, casting, heat treating and welding by using electro-optical or other suitable sensors, generally non-contact, capable of rapidly and accurately acquiring data from parts and tools used to produce them in a production “in-process” environment. Systems controls instant operation and those processes connected therewith, both upstream and downstream. Data bases are generated and knowledge bases are used.

U.S. Patent Application No. US 2001/00725225 issued to Ota et al. describes a method and an apparatus for monitoring the status of manufacturing products continuously according to one of a plurality of manufacturing processes. It is determined whether a predetermined manufacturing program corresponding to a manufacturing process has been executed. The number of operations executed for manufacturing products according to the predetermined manufacturing program is stored and output. It may be so constituted that the predetermined manufacturing program is stored through a communication device, and that the status of manufacturing products is transmitted through the communication device.

U.S. Patent Application No. US 2002/0071603 issued to Ungpiyakul et al. describes an apparatus and a method using visual imaging for combined short-term and long-term monitoring and control of a manufacturing operation which produces absorbent articles for absorbing body fluids. The system collects discrete real-time visual images and sends the information to a memory storage system. Process control logic preferably analyzes the visual images in real-time, and sends results signals to manufacturing control, which modifies the manufacturing control. Image collection is preferably synchronized with advancement of the work pieces or product, or process steps, along the manufacturing process line.

Monitoring, 5 pages, http://www.manufacturingpulse.com/news_events/smta_oct_2001_manufacturing_pulse.pdf a suite of software products for manufacturing facilities that provides real-time monitoring of process quality, equipment, utilization, and diagnostics using both Generic Equipment Model (GEM) and non-GEM compliant machines. This Motorola developed software provides a solution for process monitoring feedback delays and calculation inaccuracies connected with manual data collection. It provides real-time equipment monitoring, real time quality monitoring, an alarm management system, an intuitive Graphical User Interface, World Wide Web access to data, and Dynamic Configuration capability.

Gensym Corp., Real-time Monitoring Diagnosis, Control and Process Optimization, 3 pages, <http://www.gensym.com/manufacturing/> describes a real-time expert system platform that captures and applies knowledge for manufacturers. Reasoning engines transform real-time data, historical data, human expertise, and business policies into conclusions that provide operations advice and automatically execute actions. These platforms make possible real-time applications that better manage abnormal process conditions, more consistently control product quality, and improve optimization of processes and overall production.

Syscon Int'l, Inc., Data Collection Modules, 4 pages, <http://www.syscon-plantstar.com/literature/dcm.pdf> describes a system comprising data collection modules ("DCM"). The new DCM is a WEB-enabled industrial grade touch screen computer responsible for monitoring and displaying machine production and process information. This equipment is capable of gathering information from a combination of sources including Ethernet, analog and digital sensors or serial data inputs such as programmable logic controllers.

D. Distinction Between Applicant's Claimed Invention And References

None of the references disclose or suggest an apparatus or method which includes an allocation arrangement for receiving equipment status, wherein the equipment status data includes operation mode data as in claim 1 or a data collection unit including a mode switch as in

claim 25. Furthermore, none of the references disclose or suggest the collection and analyzing of various production costs to compare the actual production cost versus the scheduled production cost as in claim 18. Finally, none of the references disclose or suggest a system or method where a master device polls a plurality of slave devices in a predetermined order to collect real time data as in claims 8 and 31. Applicant respectfully submits that the claimed invention is not disclosed or suggested by any of the aforementioned references for at least the reasons described above.

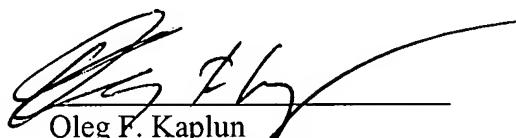
E. Conclusion

By this Petition to Make Special, Applicant respectfully requests that the above-identified application be granted special status pursuant to 37 C.F.R. § 1.102(d) and M.P.E.P. 708.02, Subpart VIII. A required fee in the amount of \$130.00 is enclosed herewith.

Early and favorable acceptance of this petition and application is respectfully requested.

Respectfully submitted,

Sept. 20, 2002
Dated



Oleg F. Kaplun
Registration No. 45,559

FAY KAPLUN & MARCIN, LLP
150 Broadway, Suite 702
New York, NY 10038
Phone: (212) 619-6000
Fax: (212) 208-6819